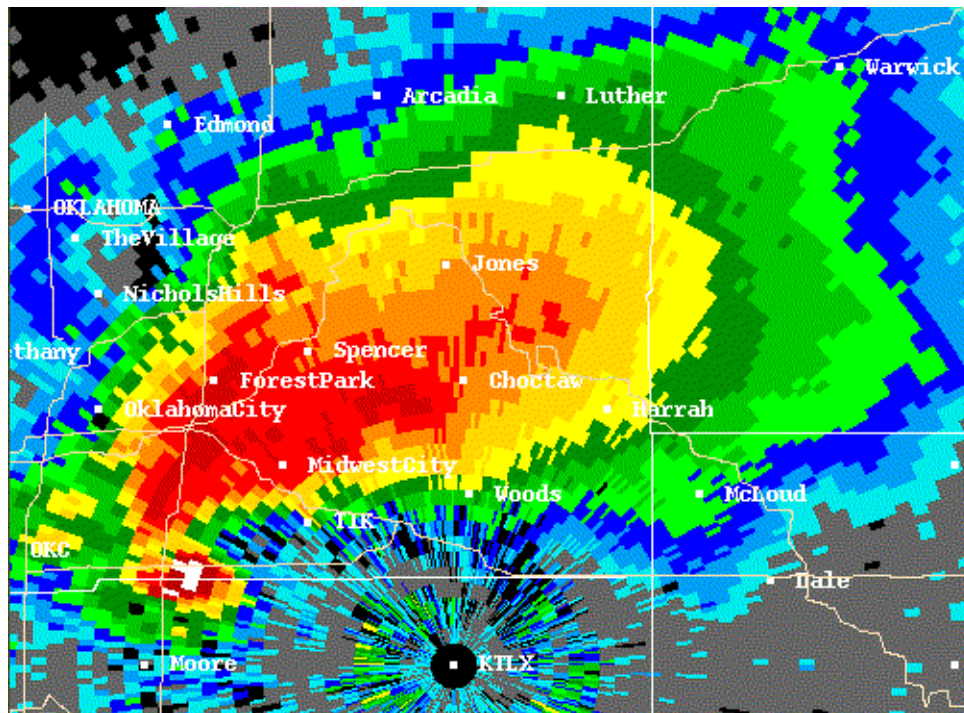# Distance Learning Operations Course

Orientation

Presented by the

Warning Decision Training Branch

Introduction

Welcome to the Distance Learning Operations Course (DLOC)! This course will significantly contribute to you becoming an experienced WSR-88D operator. A thorough knowledge of the WSR-88D's products and operational procedures is essential to fully utilize this valuable tool. Skilled interpretation of WSR-88D data is fundamental to making good forecast and warning decisions.

This document has two purposes. You will use it as a reference while attending the Course Orientation teletraining session. You will also use this document as a resource as you progress through the course.

This Orientation teletraining session will provide you with a thorough outline of course content, as well as an overview of course procedures. For example, you will need to know when and how to take a particular course exam.

It is ***very important*** that your Training Officer attend your Course Orientation teletraining session with you. This will help everyone to get started knowing what to expect as the course progresses.

Lead Instructor

The first step in the Course Orientation is introducing you to your Lead Instructor. The Lead Instructor will be your point of contact at the Warning Decision Training Branch (WDTB) for the duration of the course. He or she can help you with all aspects of the course. If you have questions about content or course logistics, please contact your Lead Instructor. Also, your Lead Instructor may contact you from time to time to check on your progress or to let you know of any changes.

Lead Instructor: _____

Phone Number: (405) 366 - 6560 x 42_____

E-mail Address: _____@noaa.gov

Sometimes, your Lead Instructor may not be immediately available. If you need to contact someone in our branch, please call or e-mail Linda Curtis, our Administrative Assistant.

Linda's phone number: (405) 366 - 6560 x 4222

Linda's e-mail: Linda.J.Curtis@noaa.gov

Local Training Officer Support

Successful administration of this course is *highly dependent* on the support of your local office management, particularly your Training Officer. Most likely this person will be your SOO, or some-one that your SOO has designated. Your DLOC Training Officer will be the office contact person for course administration. For example, the Training Officer will receive any materials that we mail to the office related to the DLOC and will then distrib-ute them to you as appropriate.

Course Materials

This document should have arrived as part of a larger packet of course materials. The following is an itemized list of the course materials that should now be in your possession.

1. Large 3-ring binder

2. Tabs for the binder

3. Instructions for IC 5.1, "Radar Applications Using AWIPS" (you'll find out what this IC busi-ness is about shortly)

4. Instructions for IC 5.2, "Introduction to the WSR-88D"

5. Instructions for IC 5.3 Precursor, "Principles of Meteorological Doppler Radar"

6. Student Guide for IC 5.3, "Principles of Meteorological Doppler Radar"

7. Student Guide for IC 5.4, "Base Products and Velocity Interpretation"

8. Student Guide for IC 5.5, "Derived Products"

9. Instructions for IC 5.6, "System Operations and Control"

10. Student Guide for IC 5.7, "Convective Storm Structure and Evolution"

11. Outline for IC 5.8, "DLOC Workshop"

If any of these materials are not in your packet, *first* check with your Training Officer to ensure that everything has been distributed. If something is still missing, contact your Lead Instructor.

History of the DLOC

Though constantly updated as the WSR-88D evolves, the DLOC is a course that has a long history. From 1990 to 1997, it was known as the WSR-88D Operations Course and was taught in residence in Norman, OK. In 1997, due to budget constraints, the decision was made to teach the course on-station rather than in residence. This involves a combination of delivery methods such as teletraining, CD-ROM, web modules and paper modules. Though the course content did not change, the course was retooled to account for the new delivery methods and the first DLOC was delivered in 1998. A residence component (DLOC Workshop) was added in 1999.

Time commitment

When the course was taught in residence, it was nearly four weeks long. Since the goals and objectives of the course have not changed, the on-station version, DLOC, requires a *significant* time

commitment. Scheduling at a WFO is often a challenge, so planning ahead as much as possible is recommended.

The NWS Training Program uses the Professional Development Series (PDS) to structure training based on associated job skills, knowledge, and/or abilities. Each PDS contains a large body of training developed for specific job responsibilities such as forecasting and warning for severe convective storms. Within each PDS are Instructional Components (ICs), which are designed to address the training needs of each specific job responsibility. ICs can utilize various instructional delivery methods, e.g. residence courses, teletraining sessions, web modules, or CD-ROMs. These ICs, taken together, form the logical sequence within a Professional Competency Unit (PCU). A PCU is a subset of each PDS, targeting specific job task skills and knowledge.

Professional Development Series

The DLOC is part of the Integrated Sensor Training (IST) PDS. The WSR-88D is one of many important sensors for weather interrogation. The IST PDS offers training on the best use of a variety of sensors, particularly in an integrated environment such as AWIPS.

Integrated Sensor Training PDS

The DLOC comprises PCU #5, "Using Radar Data and Products". The DLOC is composed of a series of ICs that make up this PCU.

Professional Competency Unit #5

See Figure 1 for an overview of the PDS structure.

The following are the specific job task skills, knowledge, and abilities that the DLOC addresses. The course objectives, which are presented as you progress through the DLOC, are based on these job task skills and knowledge.

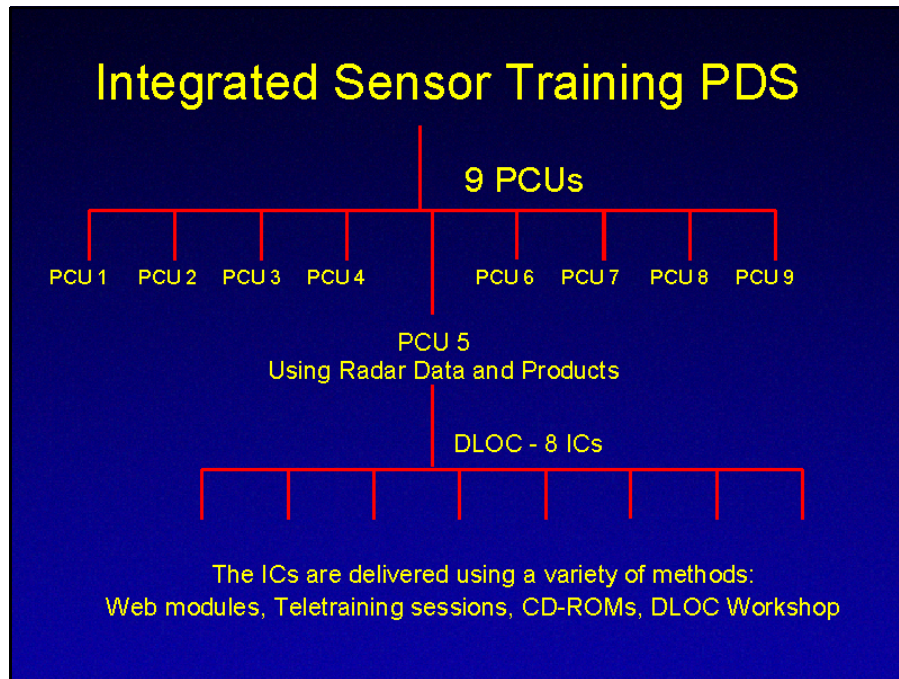**Job Task Skills and Knowledge**

Figure 1.   An overview of the PDS structure.

1. Display and manipulate WSR-88D products using the AWIPS workstation.

2. Describe the basic equipment groups (and primary components) of the WSR-88D system and the functions they perform.

3. Describe the processes by which the WSR-88D estimates precipitation and the potential error sources involved in these processes.

4. Describe the processes by which Doppler velocity information is obtained by the WSR-88D.

5. Describe the base data generation process.

6. Identify inherent limitations in pulsed Doppler radar and show how operators can mitigate data ambiguities on associated products.

7. Interpret various large and small scale Doppler velocity patterns and their corresponding meteorological conditions.

8. Interpret all Base and Derived products of the WSR-88D including:

   a. Specific characteristics of Base and Derived products.

   b. Strengths and limitations of Base and Derived products.

   c. Specific operational applications of Base and Derived products.

9. Describe basic systems operations, communications aspects, and control of system components of the WSR-88D.

10. Identify the fundamental relationships and physical processes that buoyancy and vertical wind shear have on convective storm structure, type, and evolution.

11. Identify environmental characteristics, conceptual models, and radar signatures associated with the spectrum of convective storms.

12. Identify contributing factors of discrete azimuthal sampling that may distort Mesocyclone and Tornadic Vortex Signatures (TVSs).

13. Identify typical 3-D storm-relative velocity signatures associated with stages of mesocyclone core evolution.

14. Choose the appropriate volume scan strategy for any given weather situation.

15. Recognize impacts of vertical sampling resolution on algorithm performance.

16. Identify strengths and limitations of using WSR-88D data in winter weather situations.

17. Understand the role of using WSR-88D data in the severe weather warning process (see also the Severe Convection Forecasting and Warning PDS) especially

   a. the variables which influence the warning decision.

b. the concept of situation awareness.

c. aspects of effective decision making.

d. severe weather warning methodologies.

18. Employ effective strategies for optimizing data quality such as using

a. proper settings of the Nominal Clutter Area.

b. proper settings of Clutter Suppression.

c. proper settings of the PRF.

d. proper settings of adaptable parameters.

DLOC Instructional Components and Exam Schedule

The DLOC (and thus PCU #5) is divided up into Instructional Components (ICs). Each of these ICs is a different module of training, with varying delivery methods. It will be very helpful to you to stay familiar with the ICs as you progress through the course. It is particularly important that you

1. complete the ICs in the appropriate order.

2. complete each exam as soon as possible after you've finished the IC(s) that the exam covers.

3. complete all the exams before attending the DLOC Workshop, which will serve as a "wrap-up" for the course. ***You will not receive your course certificate at the workshop if you have not completed all of the exams.***

4. arrive at the DLOC Workshop "warning ready". This means that you have sufficient AWIPS experience (displaying products, using Warn-Gen, etc.) to issue warnings during the workshops scenarios.

Objectives

As you progress through the course, the individual ICs will have written objectives that specify the material that you are expected to know. Following the objectives for test preparation is the most effective way to succeed in the DLOC!

The following is the listing of each DLOC IC, with information on its content, delivery method, and expected completion time. In parenthesis, you will find the specific Job Task Skills and Knowledge item(s) that the IC addresses. You will also find the prerequisite for each IC. This will guide you in completing the material in the proper order.

You will also find information on the exams, such as the type of exam, content (ICs) that each exam covers, as well as a completion schedule. There is an AWIPS Radar Proficiency Exam, which is a printed document. The AWIPS Radar Proficiency Exam is administered on station. The other course exams (Exams 1-5) are administered on-line.

Exams

The first step in completing the DLOC is attending the DLOC Orientation. This one-hour teletraining session gives you and your Training Officer a chance to meet your lead instructor and prepares you to take the course. Since it is not part of the actual instructional material, it does not have an IC number assigned to it.

DLOC Orientation

Delivery Method: The Web and Onsite Training Officer

IC 5.1 "Radar Applications Using AWIPS"
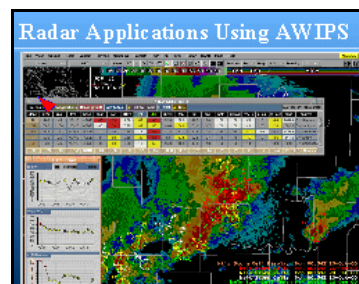
Prerequisite: Orientation Teletraining

Expected Completion Time: 22 hours

This set of "job sheets" describes the basic functionality and characteristics of using radar products on the AWIPS workstation. (1)

AWIPS Radar Proficiency Exam	The AWIPS Radar Proficiency Exam covers the objectives from IC 5.1. It will be administered by your Training Officer. You will complete a series of tasks at the AWIPS workstation to demonstrate proficiency at displaying and manipulating radar data. You are ***strongly encouraged*** to complete the AWIPS Radar Proficiency Exam as early in the course as possible! You ***must*** complete this exam before IC 5.8, the DLOC Workshop!

Achieving AWIPS Radar Proficiency is an essential element to being "warning ready" when you arrive at the DLOC workshop. Performing one or more WES simulations prior to the workshop would be especially beneficial.

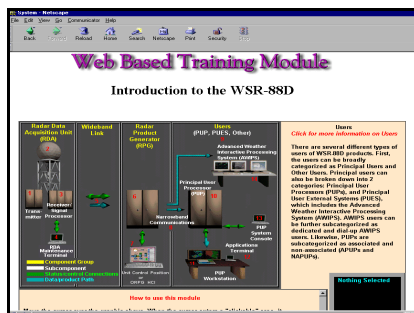## IC 5.2 "Introduction to the WSR-88D"

Delivery Method: The Web

Prerequisite: None

Expected Completion Time: 2 hours

An overall system description is provided, covering the equipment groups (RDA, Wideband Communications, RPG, and Users) and their primary sub-components. (2)

Note! There are IC 5.2 objectives and they are tested on Exam 1!

Delivery Method: The Web

Prerequisite: IC 5.1 and 5.2

Expected Completion Time: 2 hours

This precursor module will prepare you for IC 5.3, which is the first lengthy instructor led portion of the course.

Precursor: IC 5.3 "Principles of Meteorological Doppler Radar"
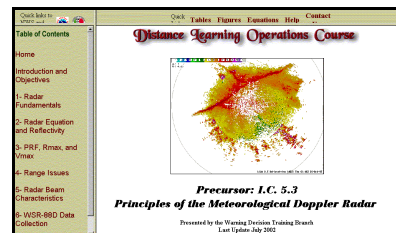

Delivery Method: Teletraining

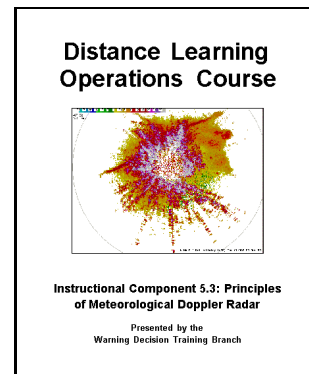Prerequisite: IC 5.3 Precursor

Expected Completion Time: 9 hours

This module is delivered in three 3-hour teletraining sessions which are taught on three consecutive days. Topics covered are Precipitation Estimation, Signal Processing, Base Data Generation, and Mitigation of Data Ambiguities. (3-6)

IC 5.3 "Principles of Meteorological Doppler Radar"

This is a multiple choice exam covering the objectives from IC 5.2, the IC 5.3 Precursor, and IC 5.3. It is administered on-line, thus you can complete it anytime, once you are ready. Your Training Officer will have the necessary information to access the exam. You are *strongly encouraged* to complete this exam before moving on to IC 5.4! You *must* complete this exam before IC 5.8, the DLOC Workshop!

Exam 1

IC 5.4 "Base Products and Velocity Interpretation"

Distance Learning
Operations Course

IC 5.4: Base Products and
Velocity Interpretation

Presented by the Warning Decision Training Branch

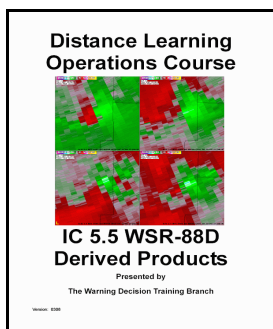Delivery Method: Teletraining

Prerequisite: IC 5.3

Expected Completion Time: 4 hours

This IC is taught in two 2-hour teletraining sessions which are delivered on two consecutive days. This will describe the suite of Base Products and their applications, as well as methods of interpreting large and small scale velocity patterns, and horizontal discontinuities (e.g.fronts). (7,8,13)

Exam 2

This is a multiple choice exam covering the objectives from IC 5.4. It is administered on-line, thus you can complete it anytime, once you are ready. Your Training Officer will have the necessary information to access the exam. You are **strongly encouraged** to complete this exam before moving on to IC 5.5! You **must** complete this exam before IC 5.8, the DLOC Workshop!

IC 5.5 "Derived Products"

Distance Learning
Operations Course

IC 5.5 WSR-88D
Derived Products
Presented by
The Warning Decision Training Branch

Delivery Method: Teletraining

Prerequisite: IC 5.4

Expected Completion Time: 9 hours

This module will present the suite of Derived Products and their applications. Derived Products will also present relevant information on the algorithms that generate the various products and displays. This IC is taught in three 3-hour teletraining sessions on three consecutive days. (8)

This is a multiple choice exam covering the objectives from IC 5.5. It is administered on-line, thus you can complete it anytime, once you are ready. Your Training Officer will have the necessary information to access the exam. You are **strongly encouraged** to complete this exam before moving on to IC 5.6! You **must** complete this exam before IC 5.8, the DLOC Workshop!

Exam 3

Delivery Method: The Web

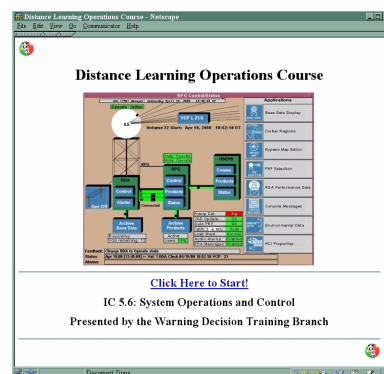Prerequisite: IC 5.2 (however, completion of ICs 5.3, 5.4 and 5.5 is **encouraged**)

Expected Completion Time: 10 hours

This module provides an understanding of overall WSR-88D operations and basic familiarization with the Master System Control Function (MSCF) and the Radar Product Generator (RPG) Human Computer Interface (HCI). (9)

IC 5.6 "System Operations and Control"

This is a multiple choice exam covering the objectives from IC 5.6. It is administered on-line, thus you can complete it anytime, once you are ready. Your Training Officer will have the necessary information to access the exam. You are **strongly encouraged** to complete this exam before moving on to IC 5.7! You **must** complete this exam before IC 5.8, the DLOC Workshop!
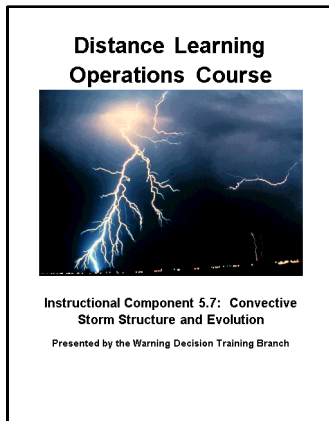
Exam 4

IC 5.7 "Convective Storm Structure and Evolution"

Distance Learning Operations Course

Instructional Component 5.7: Convective Storm Structure and Evolution

Presented by the Warning Decision Training Branch

Delivery Method: The Web and Teletraining

Prerequisite: RTM-230 (NWSTC Remote Training Module - Skew T Log P Diagram and Sounding Analysis)

Expected Completion Time: 15 hours

Recommended reading:

1. *A Convective Storm Matrix: Buoyancy/Shear Dependencies* (CD produced by COMET , March 1996)

2. *Anticipating Convective Storm Structure and Evolution* (CD produced by COMET, 1996)

3. *Mesoscale Convective Systems: Squall Lines and Bow Echoes* (Web/CD produced by COMET, 1999)

4. Bibliography Page

This IC is developed as a DLOC study guide and overview of selected material covered in the COMET CDs listed above. The student guide will complement the teletraining which is delivered in three 3-hour sessions on three consecutive days. The teletraining will provide a summary and review of the objectives in preparation for the Instructional Component examination. (10,11)

Exam 5

This is a multiple choice exam covering the objectives from IC 5.7. It is administered on-line, thus you can complete it anytime, once you are ready. Your Training Officer will have the necessary information to access the exam. You ***must*** complete this exam before IC 5.8, the DLOC Workshop!

Delivery Method: Residence

Prerequisites: Completion of **all** Course exams. This is very important. ***You will not receive your course certificate at the workshop if you have not completed all of the exams.*** Arrival at the workshop "warning ready". In addition to successful completion of the AWIPS Proficiency Exam, performing one or more WES simulations prior to the workshop is recommended.

Expected Completion Time: 28 hours

This workshop is designed to culminate all the materials from the DLOC. Topics include:

1. Identification of severe thunderstorm features using radar and integrated sensor techniques. (13)

2. Mesocyclone and TVS recognition, radar detection of large hail, sampling considerations, and winter weather applications. (12-16)

3. Discussion of Warning Decision Making issues, along with student participation in simulated real-time scenarios of severe weather cases. (17)

4. WSR-88D optimization and future evolution. (18)

As you progress through the course, you will need a resource for course information, accessing web modules, registering for teletraining, etc. The best place to start will always be the DLOC home page (Figure 2). The URL is

http://wdtb.noaa.gov/DLCourses/dloc/dlocmain.html

IC 5.8 "DLOC Workshop"

Sources of Information

Figure 2. The DLOC Home Page.

This page will provide you with links to everything that you will need. Examples include the DLOC description and registration pages.

Teletraining Registration

For each IC that is delivered using teletraining, you can choose to attend one of several sections that will be available. You may choose the section that best fits your work schedule. However, enrollment is conducted on a first-come, first-served basis, so early enrollers are most likely to get the sections they want!

Enrollment Coordination

It is important that you *do not register for a particular section until you have coordinated your schedule with local office management*. If there is more than one person from your office enrolled in the DLOC, we strongly encourage you to register for the same teletraining sessions. Attending together will enhance your learning experience, as you can often learn from one another.

Coordination is important for another reason. The facility used for your session (often the office conference room) must be available at the date and time of your session.

You have significant flexibility with respect to attending the various teletraining sessions. Since you choose which teletraining section to attend, the amount of time between sessions is up to you. If you wish to complete the teletraining in a compressed format, there is enough overlap from one IC to the next to allow you to do so. ***In fact, it would be possible to attend all of the teletraining within a few weeks, though this would also result in the need to complete one exam a week!***

The DLOC planning schedule can be accessed from the DLOC Home Page, and can be used to plan your teletraining attendance.

Course Planning

Teletraining Overview

Teletraining will be conducted using the VISITview software. VISITview is Internet based, which means that data transfer occurs over the Internet. The NWS does not have a closed, dedicated Intranet and outages may occur from time to time. This could prevent the instructor from doing things such as advancing slides or annotating an image.

Should an Internet outage occur, VISITview has a local mode, which allows each site to advance the presentation slides on their own. We will use this as a backup mode if necessary, so it is important to be familiar with loading "*local.bat"

Teletraining Technology

Audio	What about the audio connection? We will schedule an ordinary audio conference call and everyone attending a teletraining session will dial into the call before the session. This will result in better audio quality than could be attained over the Internet. It will also allow the audio connection to remain in place should any interruptions in the data flow occur over the Internet.
	The DLOC audio conference phone number is
	877-939-4309
	The passcode is 158482
Preparing for a Teletraining Session	A few days prior to your session, the VISITview files must be downloaded and installed on the PC that will be used for your session. This should be done by your Training Officer or his or her designate. An executable file will be posted on the WDTB website. Once the file is downloaded, stored and extracted on your office teletraining PC, the presentation and all the necessary VISITview software is stored and ready for your session.
Teletraining Protocol	As a general rule, the instructor does the logistical work and you get to relax and learn. Your instructor will control the slides that are displayed, and will perform most of the annotations. Interaction within the group is very important to the process, and your instructor will do a variety of things to include members of the class. From time to time, students will be called upon to answer questions or draw something on the display. This may be done both individually or in groups.
Student guides	Bring your student guide with you to be used during you teletraining session. The guide will follow the presentation closely, allowing you to take notes

and to organize your thoughts. Another tremendous advantage in comprehending the material is to review the guide before your session.

We will ask that you keep the microphone on your speakerphone muted during the presentation, except when the instructor calls on you. Though we like to hear from everyone, background noise is inevitable when the microphones are left on during the presentation, and it can sometimes be distracting. It is very important that local office management understands that you are in a training session and that you should not be interrupted except for rare events. Do whatever you can to secure a quiet area for your session. For example, keep the door closed and/or hang a big "Do Not Disturb" sign somewhere for all to see! Questions??????	Muting the phones